

TAKING THE **PULSE** OF COASTAL **MARINE** ECOSYSTEMS WORLDWIDE

Answering key ecological questions of societal
relevance for better management and sustainability
of marine resources

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A photograph of two men on a boat. The man in the foreground is wearing a blue jacket, sunglasses, and a grey beanie, and is wearing an orange life jacket. The man behind him is wearing a grey jacket, a green cap, and an orange life jacket. They are on a white boat with a red inflatable boat visible in the background. The text 'MARINEGEO CENTRAL QUESTIONS' is overlaid on the right side of the image.

MARINEGEO CENTRAL QUESTIONS

How do coastal marine ecosystems **work**?

1. What controls the **structure, function, and biodiversity** of marine ecosystems?
2. Why is **marine biodiversity** important?
3. How and why is it **changing** around the world?
4. What **management and policy strategies** are effective in maintaining healthy ecosystems?

OUR COASTS: LIVING IN THE ANTHROPOCENE



Where humans and
marine biodiversity are
concentrated and
interact most

Research themes:

- Distribution and abundance of habitat and biodiversity
- Continuum across pristine, natural, degraded, and restored habitats
- Invasive species
- Habitat loss
- Fishing impacts
- Consumer pressure

A photograph of a diver in a blue wetsuit and yellow BCD, holding a camera, swimming over a vibrant coral reef. In the foreground, a stack of white, rectangular monitoring plates is visible on the reef. The text "OUR PARTNERS" is overlaid in white, bold, sans-serif font.

OUR PARTNERS

International networks

- *Zostera* Experimental Network
- *Thalassia* Experimental Network
- Reef Life Survey
- Global Coral Reef Monitoring Network
- Autonomous Reef Monitoring Structures
- Global Genome Initiative

Intergovernmental & Interagency

- Group on Earth Observations-MBON
- Global Ocean Observing System
- U.S. MBON
- NOAA Sentinel Site Program
- National Estuarine Research Reserves (AK, CA, HI, TX)
- U.S. Forest Service

A photograph of three people in a field of tall green grass. One person in a white shirt and camouflage pants is on the left, bent over. Two other people, one in a yellow shirt and one in a green shirt, are on the right, also bent over and working. A shovel is stuck in the grass to the right.

WHAT IS MARINEGEO?

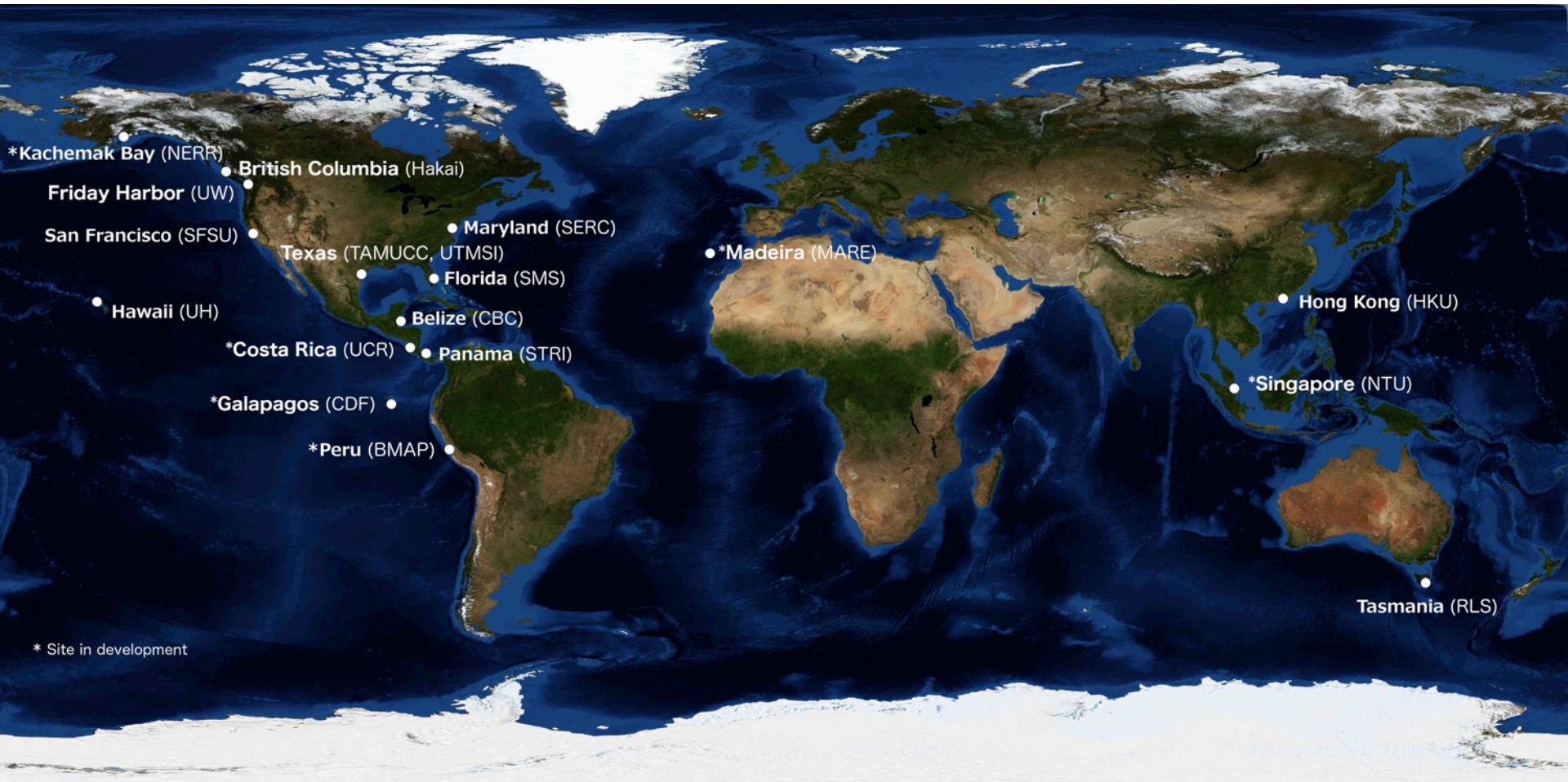
MarineGEO niche IS:

- Biodiversity and ecosystem function
- Coastal, shallow, benthic habitats
- Standardized sets of experiments and observations
- Long-term and interdisciplinary
- Coordinated across a global network of partnerships
- New and growing

IS NOT:

- Physical and chemical oceanography
- Open, pelagic ocean
- Only remote-sensing or observation
- Short-term, flash-in-the-pan
- Local or regional only

PHASE I: GROW THE NETWORK



PACIFIC EXPANSION



- British Columbia, Canada
- Friday Harbor, WA
- San Francisco, CA
- Kane'ohe Bay, HI
- Tasmania





SALT MARSH VEGETATION



MANGROVES



ROCKY INTERTIDAL



SEAGRASSES

MARINEGEO CORE RESEARCH

ENVIRONMENTAL FORCING FACTORS

- Temperature
- Salinity
- Dissolved oxygen
- Turbidity
- Pressure
- Fluorescence
- Nitrogen
- Precipitation
- Carbon chemistry, pH

BIODIVERSITY QUANTIFICATION

- Habitat mapping
- Collections
- Structural complexity
- Foundation species
- Infauna
- Epifauna
- Fishes

ECOSYSTEM PROCESSES

- Primary production
- Recruitment
- Decomposition
- Herbivory
- Predation
- Disease
- Historical ecology

EXPERIMENTS

- Coordinated
- Comparative
- Macro-ecological
- Function-oriented
- Management-relevant



CORAL REEFS



OYSTER REEFS

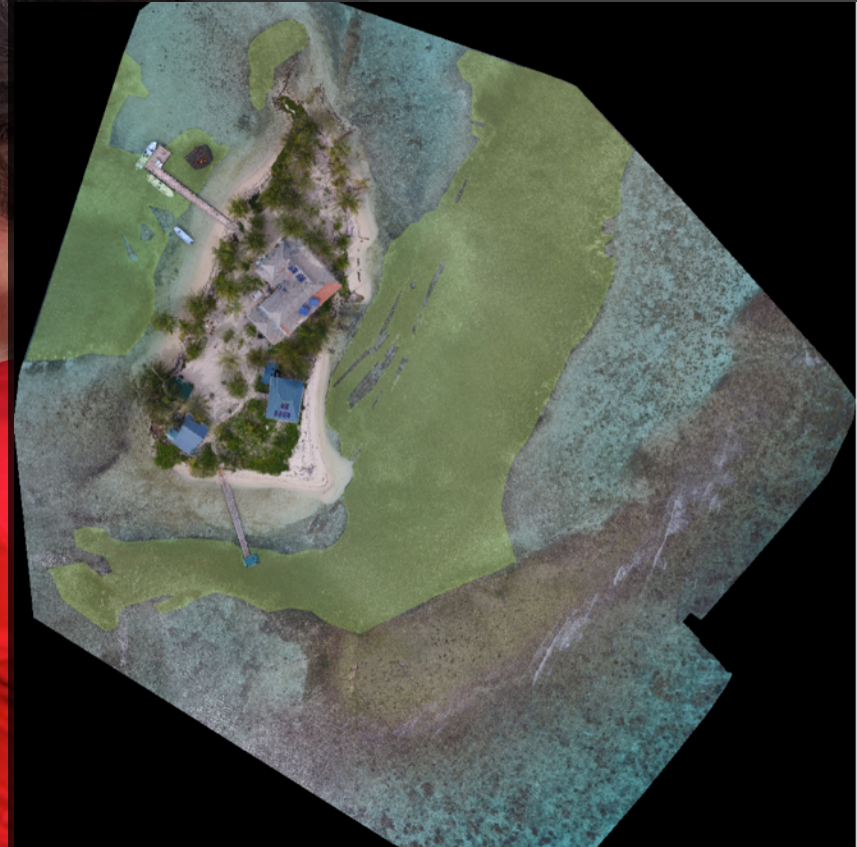


KELP FORESTS



SOFT SEDIMENTS

MAPPING THE SEASCAPE



MARINEGEO - HAWAII

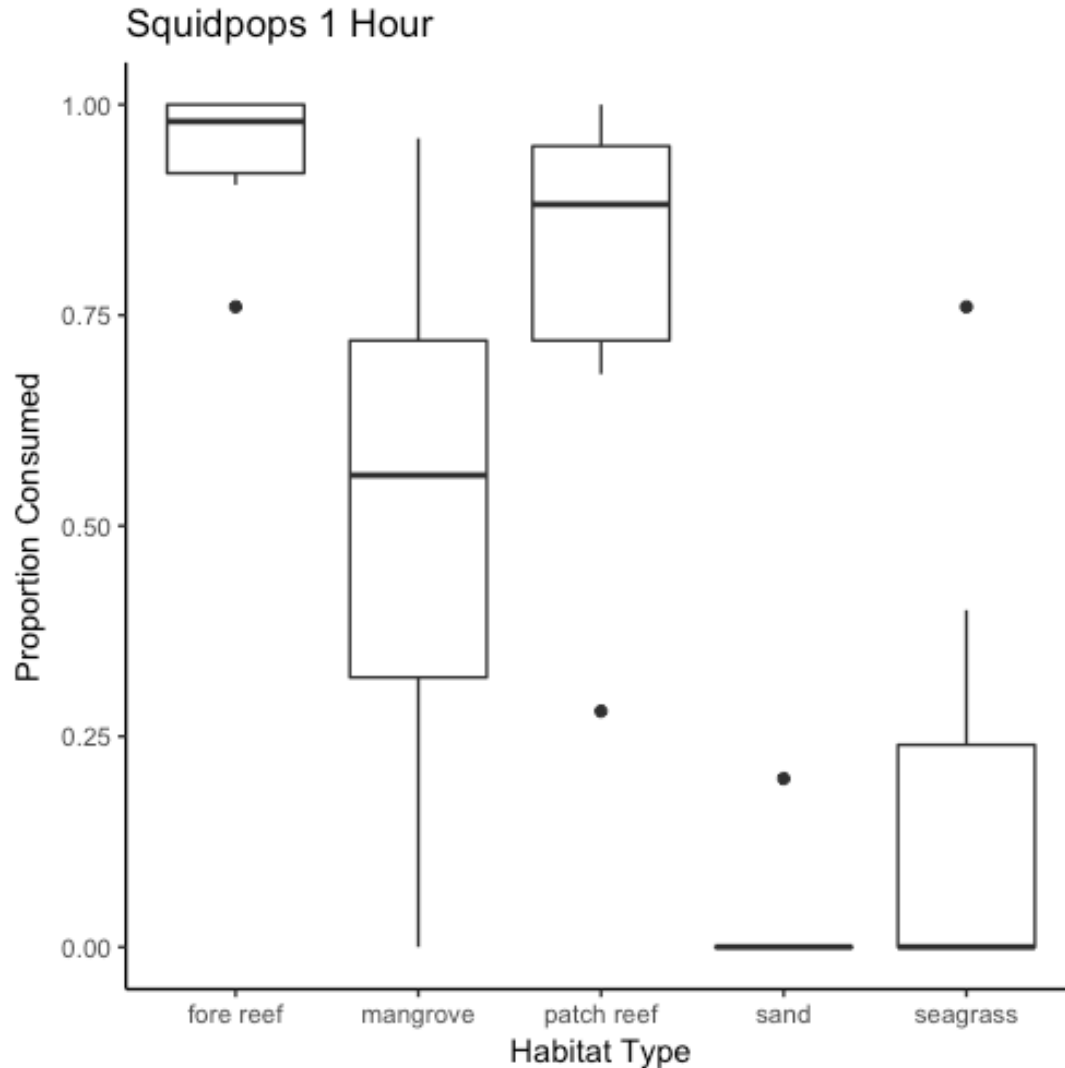


Photo: himb.hawaii.edu, Levy

+ COLLECTIONS & TEK



EXPERIMENTS: OCEAN BITEMAP



Squidpops + Seine/GoPro

- >40 participants
- 5 continents
- Feeding intensity
- Fish diversity
- Seagrass vs. sand

Participate

bitemap.wordpress.com

A close-up photograph of a coral reef. A large, vibrant red sea anemone or coral is the central focus, surrounded by other colorful marine life including purple and orange corals. The background is dark and slightly out of focus.

CHALLENGES WE FACE

- Limited resources
- Scope & direction
- Network growth
- Communication
- Data management



+ DATA MANAGEMENT

MarineGEO Seeks Job Applicants

Data and Information Technology Coordinator



The Smithsonian Marine Global Earth Observatory (MarineGEO) seeks a talented, motivated, and collaborative person to help implement and expand a network-wide data/information system to support its scientific mission of conducting coordinated, global research on marine biodiversity and ecosystems. This position serves as the data and information technology coordinator, a key role for the MarineGEO network of partners dispersed nationally and internationally. The coordinator serves a central function of facilitating research and data-driven discovery across the network by stewarding data management, system administration, and data collaboration.

Proposed shared schema for Kaneohe Bioassessment

Updated 05/24/17 by EDC

The schema is broken into two subtables, one of which describes a sampling event at a particular locality, and the other of which describes individual occurrences and samples derived from those occurrences. Fields are described with their DarwinCore term, followed by field names that were common among the disparate templates that we looked at. Where appropriate there is also a description of the format for that field, including a controlled vocabulary where necessary. Red fields are required prior to departure from Coconut Island.



UPCOMING OPPORTUNITIES

2017-2018

- Baseline data collection at new sites in the Pacific & Gulf
- Continued monitoring on the Atlantic
- Ocean Bitemap
- Pan-American Experiment
- Data systems management
- Workshop on leveraging university participation
- Strategic planning

Long-term

- Build a global network of long-term coastal biodiversity observatory partners
- Add 10 more sites in 5-10 years
- Develop specialized areas of research branching off the core
- Engage citizen scientists

THE SMITHSONIAN'S MARINEGEO

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Questions?

